



ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating (2026): 4.97
IJAFA 2026; 8(8): 750-753
www.agriculturaljournals.com
Received: 21-06-2026
Accepted: 25-07-2026

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Economic analysis of thin Poha processing units in Bhandara district, Maharashtra

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DOI: <https://www.doi.org/10.33545/2664844X.2026.v8.i8i.1838>

Abstract

This study was conducted to analyse the cost structure, returns, and break-even position of Thin Poha processing units in Bhandara district of Maharashtra during 2025-26. Data were collected from six selected units across three tahsils, representing both small and large enterprises. The results revealed that the total capital investment was ₹10.42 lakh for small units, ₹30.26 lakh for large units, and ₹20.28 lakh overall, with annual establishment costs of ₹0.69 lakh, ₹1.51 lakh, and ₹1.10 lakh respectively. Fixed costs per quintal were ₹194.44, ₹122.96, and ₹140.83, while variable costs per quintal remained uniform at ₹3,980. Gross returns amounted to ₹89.56 lakh for small units, ₹271.85 lakh for large units, and ₹180.71 lakh overall, resulting in net returns of ₹14.42 lakh, ₹50.30 lakh, and ₹32.36 lakh respectively.

The benefit-cost ratio was above unity (1.19, 1.23, and 1.22), and break-even output was significantly lower than actual production, with margins of safety exceeding 80 percent. These findings confirm that Thin Poha processing is financially viable, contributing to value addition, rural employment, and sustainable utilization of rice in the region.

Keywords: Thin Poha, rice processing, cost and returns, break-even analysis, benefit-cost ratio, Bhandara district, Maharashtra agriculture

Introduction

Rice is an important agricultural commodity of India and plays a significant role in the agricultural economy of Maharashtra. Bhandara district is a major rice-producing region where paddy is processed into various value-added products. Among these, Thin Poha (flattened rice) is an important processed product that contributes to value addition, employment generation and better utilization of paddy.

The profitability of Thin Poha processing depends on the expenditure incurred on raw material, labour, energy, packaging, transportation and fixed investment, along with returns from the main product and by-products. Hence, analysis of cost and returns and determination of the break-even level are essential for assessing the economic performance of processing units. The present study was therefore undertaken to analyse the cost, returns and break-even position of Thin Poha processing units in Bhandara district of Maharashtra. Specific objectives of this work are to estimate cost and returns of thin poha and to analyse break-even point.

Methodology

Area of study: The present study was undertaken in Bhandara District. For study three tehsils was selected, such as Bhandara, Lakhani and Tumsar and from each tehsil two units were selected. Thus total six units were selected for study.

Period of study: The data was collected for the period of year 2025-26.

Analytical tools: As per the objectives of study, the required information was collected from the Rice processing unit, various descriptive statistical tool was employed to know the profitability of rice processing and was judged with the help of variable cost, fixed cost and total cost.

Fixed cost: It includes data on the cost of machinery, building, furniture, wages of permanent employee, Laber license, insurance and taxes. The data was collected specially from each mill on the above item.

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Variable cost: Variable cost consists of expenditure on purchase of raw material waged of casual labour oil and lubricants energy charges repair maintenance of machine, packing cost and invest on working capital.

Total cost: Total cost of processing composed of the total fixed cost and total variable cost and was calculated by adding these costs together.

Total cost = Fixed cost + Variable cost

Gross Returns: The gross returns was defined as the total rate of returns on an investment before the deduction of any expenses.

Gross Return = Quantity of the product * price per unit

Net Returns: Net returns refers to returns after deducting all expenses from the gross returns generated by the investment.

Net return = Gross return -Total cost

Benefit-Cost Ratio: The benefit cost ratio compares the present value of all benefit with that of the cost and investment of the project.

$$B:C \text{ ratio} = \frac{\text{Gross return}}{\text{Total cost}}$$

Break-Even Point: Break-Even Point shows the minimum size of volume to recover total cost required for processing in a year.

$$BEP = \frac{FC}{SP - VC}$$

Where,

FC= Fixed cost, SP= Selling cost, VC= Variable cost.

Margin of safety: Margin of safety indicates the extent to which output can decline before the enterprise reaches the break-even point. A higher margin of safety indicates lower business risk.

MOS = Total Output - Output at BEP

$$MOS (\%) = \frac{MOS}{\text{Total Output}} \times 100$$

Results and Discussion

Processing of agricultural product is one of the important means of creating a time and form utility in the product, adding value to the product and boosting up the demand and supply of food products. Result are arranged as per the objectives.

Table 1: Classification of Selected Rice Processing Units According to Installed Capacity

S. N.	Category	Installed Capacity (MT/day)	Number of Units	Plant operated Days/Year
1	Small	2.00-2.50	3	215
2	Large	5.00-6.50	3	232
	Total		6	224

Cost and returns of Thin Poha

Table 2: Capital Investment for Thin Poha Units (₹ lakh)

S.N.	Particulars	Small Units	Large Units	Overall
1	Land	1.6	4.9	3.29
2	Building	1.7	3.6	2.65
3	Machinery & Equipment	5	15	10
4	Miscellaneous Expenditure	2.12	6.76	4.34
5	Total Capital Investment	10.42	30.26	20.28
6	Expected Life (Years)	15	20	17.5
7	Annual Establishment Cost	0.69	1.51	1.1

The capital investment for Thin Poha units was apportioned under four major heads, namely land, building, machinery & equipment, and miscellaneous expenditure. The total capital investment amounted to ₹10.42 lakh for small units, ₹30.26 lakh for large units, and ₹20.28 lakh overall. Considering the expected life of 15 years for small units, 20 years for large units, and 17.5 years overall, the annual establishment cost was calculated at ₹0.69 lakh, ₹1.51 lakh, and ₹1.10 lakh respectively.

Fixed Cost of Thin Poha Processing (₹ lakh/year)

The fixed cost structure of Thin Poha units comprised depreciation on building, machinery, furniture, appliances, and vehicles, along with interest on fixed capital and recovery of annual establishment cost. The total fixed cost was estimated at ₹3.50 lakh for small units, ₹6.64 lakh for large units, and ₹5.07 lakh overall. With annual processing quantities of 1,800 quintals in small units, 5,400 quintals in large units, and 3,600 quintals overall, the fixed cost per quintal worked out to ₹194.44, ₹122.96, and ₹140.83 respectively.

Table 3: Fixed Cost of Thin Poha Processing (₹ lakh/year)

S. N.	Particulars	Small units	Large units	Overall
1	Depreciation on Building @ 5%	0.09 (2.57)	0.18 (2.71)	0.14 (2.77)
2	Depreciation on Machinery @ 10%	0.47 (13.43)	1.29 (19.43)	0.88 (17.47)
3	Depreciation on Furniture @ 10%	0.01 (0.29)	0.03 (0.45)	0.02 (0.40)
4	Depreciation on Appliances & Fixtures @10%	0.14 (4.00)	0.42 (6.33)	0.28 (5.56)
5	Depreciation on Vehicle @ 10%	0.06 (1.71)	0.18 (2.71)	0.12 (2.38)
6	Interest on Fixed Capital @ 12%	2.04 (58.29)	3.03 (45.63)	2.54 (50.40)
7	Annual Establishment Cost Recovery	0.69 (19.71)	1.51 (22.74)	1.10 (21.82)
8	Total Fixed Cost	3.50 (100.00)	6.64 (100.00)	5.07 (100.00)
9	Annual Quantity Processed (q/year)	1800	5400	3600
10	Fixed Cost per Quintal (₹/q)	194.44	122.96	140.83

(Figures in parentheses indicate percentage share to total fixed cost.)

Variable Cost of Thin Poha Processing (₹ lakh/year)

The variable cost of Thin Poha units was mainly driven by raw material expenses, which accounted for over 71 percent of the total. Other significant components included labour, fuel, packaging, transportation, repair and maintenance, and interest on working capital. The total variable cost was

estimated at ₹71.64 lakh for small units, ₹214.91 lakh for large units, and ₹143.28 lakh overall. With annual processing quantities of 1,800 quintals in small units, 5,400 quintals in large units, and 3,600 quintals overall, the variable cost per quintal was uniform at ₹3,980 across all categories.

Table 4: Variable Cost of Thin Poha Processing (₹ lakh/year)

S. N.	Particulars	Small units	Large units	Overall
1	Raw Material	51.20 (71.37)	153.60 (71.37)	102.40 (71.37)
2	Labour	3.20 (4.46)	9.60 (4.46)	6.40 (4.46)
3	Electricity	1.60 (2.23)	4.80 (2.23)	3.20 (2.23)
4	Fuel	2.10 (2.93)	6.30 (2.93)	4.20 (2.93)
5	Packaging	4.40 (6.13)	13.20 (6.13)	8.80 (6.13)
6	Transportation	1.75 (2.43)	5.25 (2.43)	3.50 (2.43)
7	Repair and Maintenance	0.88 (1.22)	2.64 (1.22)	1.76 (1.22)
8	Interest on Working Capital @10%	6.51 (9.07)	19.52 (9.07)	13.02 (9.08)
9	Total Variable Cost	71.64 (100.00)	214.91 (100.00)	143.28 (100.00)
10	Annual Quantity Processed (q/year)	1800	5400	3600
11	Variable Cost per Quintal (₹/q)	3980	3980	3980

(Figures in parentheses indicate percentage share to total annual variable cost.)

Table 5: Total Cost of Thin Poha Processing (₹ lakh/year)

S. N.	Particulars	Small units	Large units	Overall
1	Fixed Cost	3.50 (4.66)	6.64 (3.00)	5.07 (3.42)
2	Variable Cost	71.64 (95.34)	214.91 (97.00)	143.28 (96.58)
3	Total Cost	75.14 (100.00)	221.55 (100.00)	148.35 (100.00)
4	Annual Quantity Processed (q/year)	1800	5400	3600
5	Total Cost per Quintal (₹/q)	4174.44	4102.78	4120.83

(Figures in parentheses indicate percentage share to total annual cost.)

The cost structure of Thin Poha units revealed that variable costs dominated, accounting for more than 95 percent of the total, while fixed costs contributed only a small share. The total cost was estimated at ₹75.14 lakh for small units, ₹221.55 lakh for large units, and ₹148.35 lakh overall. With annual processing quantities of 1,800 quintals in small units, 5,400 quintals in large units, and 3,600 quintals overall, the total cost per quintal was calculated at ₹4,174.44, ₹4,102.78, and ₹4,120.83 respectively.

Gross returns of Thin Poha Processing (₹ lakh/year)

The gross returns from Thin Poha units were derived primarily from the sale of the main product, which

contributed about 95 percent of total returns. Thin Poha production amounted to 1,800 quintals in small units, 5,400 quintals in large units, and 3,600 quintals overall, with average selling prices ranging between ₹4,731 and ₹4,787 per quintal.

By-products such as rice bran, broken rice, and rice husk together contributed nearly 5 percent of total returns. The overall gross returns were estimated at ₹89.56 lakh for small units, ₹271.85 lakh for large units, and ₹180.71 lakh overall, translating into gross returns per quintal of ₹4,975.56, ₹5,034.26, and ₹5,019.72 respectively.

Table 6: Gross returns of Thin Poha Processing (₹ lakh/year)

S. N.	Particulars	Unit	Small units	Large units	Overall
1	Main Product				
	Thin Poha Produced	q/year	1800	5400	3600
	Average Selling Price	₹/q	4731	4787.67	4759.33
	Value of Thin Poha Sold	₹ lakh/year	85.16 (95.08)	258.53 (95.10)	171.85 (95.09)
2	By-products				
a.	Rice Bran Produced	q/year	40	110	75
	Rice Bran Selling Price	₹/q	2400	2550	2475
	Value of Rice Bran Sold	₹ lakh/year	0.96 (1.07)	2.81 (1.03)	1.89 (1.05)
b.	Broken Rice Produced	q/year	60	175	117.5
	Broken Rice Selling Price	₹/q	2050	2150	2100
	Value of Broken Rice Sold	₹ lakh/year	1.23 (1.37)	3.76 (1.38)	2.49 (1.38)
c.	Rice Husk Produced	q/year	105.24	306.93	206.09
	Rice Husk Selling Price	₹/q	2100	2200	2150
	Value of Rice Husk Sold	₹ lakh/year	2.21 (2.47)	6.75 (2.48)	4.48 (2.48)
3	Total By-product Returns	₹ lakh/year	4.40 (4.92)	13.32 (4.90)	8.86 (4.91)
4	Total Gross Returns	₹ lakh/year	89.56 (100.00)	271.85 (100.00)	180.71 (100.00)
5	Gross Returns per Quintal	₹/q	4975.56	5034.26	5019.72

Net Returns and B:C Ratio of Thin Poha Processing

The profitability analysis of Thin Poha units showed positive net returns across all categories. Gross returns exceeded total costs, resulting in net returns of ₹14.42 lakh for small units, ₹50.30 lakh for large units, and ₹32.36 lakh

overall. On a per-quintal basis, net returns were ₹801.11 in small units, ₹931.48 in large units, and ₹898.89 overall. The benefit-cost ratio was above unity in all cases, recorded at 1.19 for small units, 1.23 for large units, and 1.22 overall, indicating economic viability of Thin Poha processing.

Table 7: Net Returns and B:C Ratio of Thin Poha Processing

S. N.	Particulars	Small units	Large units	Overall
1	Gross Returns (₹ lakh/year)	89.56	271.85	180.71
2	Total Cost (₹ lakh/year)	75.14	221.55	148.35
3	Net Returns (₹ lakh/year)	14.42	50.3	32.36
4	Net Returns per Quintal (₹/q)	801.11	931.48	898.89
5	B:C Ratio	1.19	1.23	1.22

Table 8: Break-even Point of Thin Poha Processing

S. N.	Particulars	Small units	Large units	Overall
1	Actual quantity processed per year (q)	1800	5400	3600
2	Annual fixed cost (₹ lakh/year)	3.5	6.64	5.07
3	Selling price per quintal (₹)	4975.56	5034.26	5004.91
4	Variable cost per quintal (₹)	3980	3980	3980
5	Break-even point (Physical quantity) (q)	352	630	495
6	Break-even point (Monetary value) (₹ lakh)	17.51	31.72	24.77
7	Margin of Safety (Physical quantity) (q)	1448	4770	3105
8	Margin of Safety (Monetary value) (₹ lakh)	72.05	240.19	155.4
9	Percentage of Margin of Safety (Physical quantity) (%)	80.44	88.33	86.25
10	Percentage of Margin of Safety (Monetary value) (%)	80.44	88.33	86.25

The break-even analysis of Thin Poha units indicated that the annual fixed cost was ₹3.50 lakh for small units, ₹6.64 lakh for large units, and ₹5.07 lakh overall. With selling prices ranging between ₹4,975 and ₹5,034 per quintal and a uniform variable cost of ₹3,980 per quintal, the break-even point was estimated at 352 quintals for small units, 630 quintals for large units, and 495 quintals overall. In monetary terms, this translated to ₹17.51 lakh, ₹31.72 lakh, and ₹24.77 lakh respectively. The margin of safety was considerably high, at 80.44 percent for small units, 88.33 percent for large units, and 86.25 percent overall, confirming the financial stability and resilience of Thin Poha processing enterprises.

Conclusion

The analysis of Thin Poha processing units in Bhandara district demonstrated clear economic viability. The total capital investment was ₹10.42 lakh for small units, ₹30.26 lakh for large units, and ₹20.28 lakh overall, with annual establishment costs of ₹0.69 lakh, ₹1.51 lakh, and ₹1.10 lakh respectively. Fixed costs per quintal were ₹194.44 in small units, ₹122.96 in large units, and ₹140.83 overall, while variable costs per quintal remained uniform at ₹3,980. Gross returns reached ₹89.56 lakh for small units, ₹271.85 lakh for large units, and ₹180.71 lakh overall, resulting in net returns of ₹14.42 lakh, ₹50.30 lakh, and ₹32.36 lakh respectively. The benefit-cost ratio was above unity (1.19, 1.23, and 1.22), and break-even output was low at 352 quintals, 630 quintals, and 495 quintals compared to actual production of 1,800, 5,400, and 3,600 quintals. A high margin of safety (80.44%, 88.33%, and 86.25%) confirmed that Thin Poha enterprises are financially stable and profitable.

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